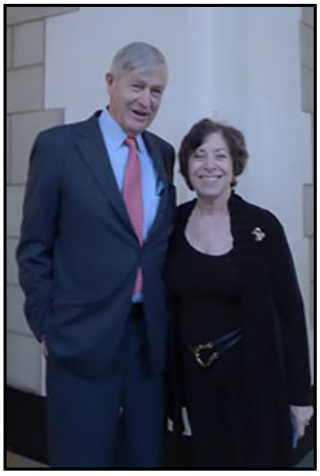
NIEHS and the Energy Future Coalition hold workshop on ultrafine particles from vehicle emissions

By Paula Whitacre

NIEHS and the Energy Future Coalition (EFC) joined forces April 1 at a workshop *(http://www.energyfuturecoalition.org/What-Were-Doing/Eliminating-Aromatics-Gasoline/Health-Effects-Fine-Particles-Vehicle-Emissions-Event)* exploring the health impacts of ultrafine particles (UFPs) from vehicle emissions. Hosted by the Institute of Medicine and held at the National Academy of Sciences in Washington, D.C., scientists invited to speak at the event faced the challenge of presenting their findings to an audience of both scientists and nonscientists, including regulators, public health advocates, and journalists.



The workshop grew out of conversations between Wirth, left, and Birnbaum. (Photo courtesy of Paula Whitacre)

NIEHS and NTP Director Linda Birnbaum, Ph.D., described the purpose of the meeting in her opening remarks. "This workshop assembles a panel of leading researchers to present the current state of our knowledge on the potential effects of UFPs with aromatics, as well as the research strategies needed to address this emerging environmental public health issue," she said.

Former Colorado Sen. Timothy Wirth, a co-founder of EFC, stressed the need for such an event. "The data seem to be coming in at a rapid and somewhat remarkable rate, and our timing for having this discussion seems to me to be about perfect," he said.

Sources and characteristics of fine and ultrafine particles

In the morning session, scientists discussed recent advances in knowledge about polycyclic aromatic hydrocarbons (PAHs), and coarse (10 microns), fine (2.5 microns), and ultrafine (nanosized) particles. Underscoring how much remains unknown, several speakers observed that UFPs might cause greater damage than their mass would suggest. "Mechanisms, composition, size, and host factors contribute to the complexity," observed Dan Costa, Sc.D., *(http://www2.epa.gov/aboutepa/about-air-climate-and-energy-research-program)* of the U.S. Environmental Protection Agency.

NIEHS grantees and staff participating in the workshop included, from left, Perera, Zhang, Birnbaum, Nel, Ritz, and Sri Nadadur, Ph.D., program director for the NIEHS NanoHealth and Safety program. (Photo courtesy of Paula Whitacre)

According to Staci Simonich, Ph.D., *(http://emt.oregonstate.edu/stacisimonich)* of Oregon State University, China and India are the world's largest PAH emitters, but the U.S. emits the most per person. Her lab has shown that air masses containing PAHs routinely travel great distances, such as across the Pacific Ocean.

Andre Nel, M.D., Ph.D., *(http://faculty.cnsi.ucla.edu/institution/personnel?personnel_id=8739)* of the University of California, Los Angeles (UCLA), stressed that the toxicological effects of fine and ultrafine particles differ, as do pulmonary retention and impacts. "Ultrafine particles go deeper into the lung," he said. "UFPs are likely to go to sites where the pathophysiology of disease is more important."

Workshop breaks provided further discussion time for grantees Simonich, left, and Perera. (Photo courtesy of Paula Whitacre)

Human health effects

Birnbaum moderated the afternoon discussion on research, funded in part by NIEHS, into health effects of UFPs and PAHs. Frederica Perera, Ph.D., *(http://www.mailman.columbia.edu/our-faculty/profile?uni=fpp1)* of Columbia University, presented her findings on associations between PAH exposure and neurodevelopmental disorders. Beate Ritz, M.D., Ph.D., *(http://www.ph.ucla.edu/epi/faculty/britz/ritz.html)* of UCLA, summarized her lab's research on air pollution's link with autism and low birth weight.

Jim Zhang, Ph.D.,
(https://globalhealth.duke.edu/people/faculty/zhang-jim)
of Duke University, analyzed data from his Beijing Olympics study, where there was a clear difference in air pollution before, during, and after the games — particularly in the levels of UFPs containing PAHs — as well as associated lung function and cardiovascular conditions. Finally, Douglas Brugge, Ph.D.,
(http://medicine.tufts.edu/Education/Academic-Departments/Clinical-Departments/Public-Health-and-Community-Medicine/Faculty/Resident Faculty/Brugge-Doug)
of Tufts University, discussed community participatory research on UFP exposure and health.

Several common threads wove through the talks. For instance, certain populations have greater exposure, due to living near roadways or other sources of UFPs. Panelists also stressed that the diseases they studied involve multiple factors. But, as Ritz noted about autism, if environmental factors account for even 10 percent of the 8,000 cases she studied, that means 800 fewer cases.

Policy implications

A closing discussion, facilitated by Wirth and EFC co-founder C. Boyden Gray, J.D., involved the audience in exploring policy implications. Topics included the key role of roadway traffic, a call for technological improvements in vehicles and fuels, and the need to distinguish effects of UFPs from those of other particulates.

One participant stressed the importance of shifting the emphasis. “Most people think of air pollution as a minor irritant,” said Robert Musil, Ph.D., president and CEO of the Rachel Carson Council. “We need to focus the problem around public health.”

(Paula Whitacre is a contract writer with the NIEHS office in Bethesda, Md.)

The Environmental Factor is produced monthly by the National Institute of Environmental Health Sciences (NIEHS)
(http://www.niehs.nih.gov/)
, Office of Communications and Public Liaison.